Aviat NETWORKS

Aprisa SRi

UTILITY-GRADE UNLICENSED DOUBLE STRENGTH RADIO

902-928 MHz Industrial Licence Free Spread Spectrum

DATASHEET [FCC / IC]

Utility-grade unlicensed radio for Aprisa edge-of-network extension and other field area network applications up to 100 km / 62 miles range. The Aprisa SRi is a licence free 902-928 MHz FCC Part 15 / IC RSS-247 radio with unprecedented flexibility and security.

- **Secure**: with its defense in depth approach including AES encryption, authentication, address filtering and user access control, the Aprisa SRi protects against malicious attacks and consumer-grade wireless vulnerabilities.
- **Flexible hopping channel and zone arrangements**: full band and reduced non-overlapping zone options allow a tailored approach to interference mitigation. Unique combination of advanced forward error correction (FEC) with packet synchronized selective ARQ combats interference. Time-sliced fast hop and advanced access control MAC delivers more usable throughput and reduced latency.
- **Future-proof**: the Aprisa SRi supports dual serial and dual Ethernet ports in a single, compact form factor, designed to cryptographically secure legacy serial, protect existing device investment, and enable new applications. Old and new application protocols can be run side by side.
- **Aprisa SR family**: the Aprisa SRi now offers two modes, 100 kHz double strength and the original 50 kHz mode. The Aprisa SRi is fully integrated with the Aprisa SR family and includes all family features such as networking, management, and security. Most existing Aprisa SRi users can upgrade to Modem 2 with a simple firmware update.
- **Advanced L2 / L3 capabilities**: selectable L2 bridge, L3 router, or advanced gateway router combination L2/L3 modes with VLAN, QoS, NAT, and filtering attributes to maximize capacity in constrained bandwidth and prioritize mission critical traffic while meeting tough security and IP network policy imperatives.
- **Link efficiency**: Adaptive Coding and Modulation (ACM) and forward error correction maintains the integrity of the wireless connection while an effective channel access scheme and advanced IP routing features ensure efficient transfer of data across the Aprisa SRi network.
- **Reliable and robust**: the Aprisa SRi requires no manual component tuning and maintains its performance over a wide temperature range using full specification industrially rated components and shared Aprisa family heritage.
- **Easily managed**: an easy to use GUI supports local element management via HTTPS and remote element management over the air, and SNMP support allows network-wide monitoring and control via a third party network management system.

Applications

- **Electricity grid**: distribution automation DA/DFA/DR and Volt/VAR cap banks
- **Smart grid**: concentrator communications and GPRS replacement
- **Renewables**: distributed energy DER/DERM for solar and wind farms
- **Water and wastewater**: flow, level, and pressure modulation
- **Oil & Gas**: wellhead automation, production metering, lift pump automation
- **Relieve capacity** constrained unlicensed field area networks
- **On site applications**: intra-substation 'inside the fence' MV substation automation, water treatment plants, single and multi-well pads
- **Tail-end links**: Aprisa SR licensed network extensions and secure communications
- **Medium range applications**: water catchment management and coalbed methane (CBM) production

Specifications

General	
Network Topology	Point-to-multipoint (PMP), Base, Remote, Repeater
Network Integration	Serial and Ethernet (router or bridge mode)

Protocols	
Ethernet	IEEE 802.3, 802.1d/q/p
Serial	Legacy RS-232 transport, Mirrored Bits ®, SLIP and Terminal Server support
Wireless	Proprietary FHSS
SCADA	Transparent to all common SCADA protocols such as Modbus, IEC 60870-5-101/104, DNP3 or similar

Radio	Frequency Band (MHz)	Tuning Range (MHz)	Tune Step (kHz)
Frequency Band	902 – 928 MHz		
Channel Size	50 kHz and 100 kHz		
Number of Channels per Hop Zone	50 in 50 kHz mode, 25 in 100 kHz mode		
Number of Standard Hop Zones	8 (non-overlapping)		
Full Band Option	400 channels in 50 kHz mode 200 channels in 100 kHz mode		
Zone / Channel Selection	Zone selection list and channel black list		
Frequency Stability	± 0.5 ppm		
Frequency Aging	< 1 ppm / annum		

Transmitter		
Max Peak Envelope Power (PEP)	1.0 W (+30 dBm)	
Average Power Output	256 QAM	0.01 – 0.16 W (+10 to +22 dBm, in 1 dB steps)
	64 QAM	0.01 – 0.2 W (+10 to +23 dBm, in 1 dB steps)
	16 QAM	0.01 – 0.25 W (+10 to +24 dBm, in 1 dB steps)
	QPSK	0.01 – 0.4 W (+10 to +26 dBm, in 1 dB steps)
Spurious Emissions	< –37 dBm	
Attack Time	< 1.5 ms	
Release Time	< 0.5 ms	
Data Turnaround Time	< 2 ms	

Receiver		50 kHz	100 kHz
Sensitivity (BER < 10^{-6})	256 QAM	–90 dBm	–87 dBm
	64 QAM	–96 dBm	–93 dBm
	16 QAM	–104 dBm	–101 dBm
	QPSK	–109 dBm	–106 dBm

Receiver Performance	
Adjacent Channel Selectivity	> –37 dBm
	[> 58 dB][1]
Co-Channel Rejection QPSK	> –10 dB
Co-Channel Rejection 256 QAM	> –26 dB
Intermodulation Responce Rejection	> –35 dBm [> 60 dB[1]]
Blocking or Desensitisation	> –17 dBm [> 78 dB[1]]
Spurious Responce Rejection	> –32 dBm [> 63 dB[1]]

Modem		50 kHz	100 kHz
Gross Data Rate	256 QAM	320 kbit/s	576 kbit/s
	64 QAM	240 kbit/s	432 kbit/s
	16 QAM	160 kbit/s	288 kbit/s
	QPSK	80k bit/s	144 kbit/s
Occupried Bandwidth	50 kHz or 100 kHz		
Forward Error Correction	Variable Reed Solomon plus convolutional code		
Adaptive Burst Support	Adaptive Coding and Modulation		

Security	
Data Encryption	256, 192 or 128 bit AES
Data Authentication	CCM
Cryptographic Protection	FIPS 140-2
IPSEC	Transparent

Interfaces		
Ethernet Ports	2 ports RJ45 10/100Base-T switch	
Serial Ports	2 ports RJ45 RS-232 Additional RS-232 / RS-485 port via USB converter (optional)	
GPS Receiver	Support for NMEA GPS receiver with radio coordinates	
Management	1 x USB micro type B (device port) 1 x USB standard type A (host port) 1 x Alarm port RJ45	
Antenna	2 x TNC 50 ohm female ANT 1 & ANT 2	
LEDs	Status: Diagnostics:	OK, MODE, AUX, TX, RX RSSI, traffic port status
Test Button	Toggles LEDs between diagnostics / status	

Product Options (specified at order)	
Protected Station Option	Providing hot-swappable / hot-standby redundant hardware switching (10-60 VDC)

Power		
Input Voltage	Radio	10 – 30 VDC negative earth
	Protected Station	10 – 60 VDC floating
Receive		< 4.5 W (326 mA at 13.8 VDC) in active receive state
		< 2.0 W (145 mA at 13.8 VDC) in idle receive state
		< 0.5 W (36 mA at 13.8 VDC) in sleep mode
		< 0.04 W (3 mA at 13.8 VDC) in smart sleep mode
Transmit		< 15 W (1086 mA at 13.8 VDC)

Mechanical		
Dimensions (not including connectors)	Radio	210 mm (W) x 130 mm (D) x 41.5 mm (H) 8.27" (W) x 5.12" (D) x 1.63" (H)
	Protected Station	434 mm (W) x 372 mm (D) x 88.9 mm (H) 2 RU 17.1" (W) 14.6" (D) 3.5" (H)
Weight	Radio	1.25 kg (2.81 lbs)
Mounting		Wall, Rack or DIN rail

Environmental	
Operating Temperature	–40 to +70 ˚C (–40 to +158 ˚F)
Humidity	Maximum 95 % non-condensing

Management & Diagnostics	
Local Management	SSH and HTTP/S web servers with full control / diagnostics Partial diagnostics via LEDs and test button Software upgrade from PC or USB flash drive
Remote Element	SSH and HTTP/S over-the-air remote element management with control / diagnostics Network software upgrade over-the-air
Network	SNMPv2 and SNMPv3 security support for integration with external network management systems
Over the Air	Low overhead SuperVisor Extended Network Management (EXM)

Compliance		
RF	FCC CFR47 Part 15.247	FCC ID: UIPSI902M160
	IC RSS-247	IC: 6772A-SI902M160
EMC		FCC CFR47 Part 15 Subpart C IC RSS-Gen
Safety		EN/UL/IEC 62368-1, CB Certified, UL listed
Hazardous locations		Class 1 division 2
Environmental		ETS 300 019 Class 3.4-2-3, Ingress Protection IP51
Electric Substation		IEEE 1613 Class 2 and IEC 61850-3

Notes:
[1] The receiver figures are shown in typical fixed interference dBm values and dB values [in brackets] relative to the sensitivity. Relative values are given for QPSK modulation and coded FEC.

[2] This device must be professionally installed. The installer must adjust the output power to meet FCC Part 15 / IC RS-247 rules after considering cable loss and antenna gain.

[3] Modem 2 software available for Hardware Type B and later, 100 kHz channels available only on Type C and later.

[4] Switchable front-end attenuator, dual antennas, and Smart Sleep available only for Hardware Type D and later.

Disclaimer

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